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11. OTHER PROJECT TYPES

The Georgia Department of Transportation (GDOT) Road Design Policy Manual is primarily written to provide guidance for the preparation of construction documents for projects involving the new construction or major reconstruction of state roadways. Guidelines, design policies, and practices discussed in this chapter address the following other types of projects:

- preventative maintenance (PM); roadway resurfacing, restoration, or rehabilitation (3R); and reconstruction projects
- bridge fencing and bridge jacking projects
- intelligent transportation system (ITS) projects
- signing and pavement marking projects
- traffic signal projects
- guardrail and/or barrier projects

The policies in this manual apply to permanent construction of Georgia roads and highways, and different controls and criteria may be applicable to temporary facilities.

11.1. Preventative Maintenance (PM), Resurfacing, Restoration, or Rehabilitation (3R), and Reconstruction Guidelines for Federal Aid Projects

The purpose of this Section is to provide design guidelines and procedures that cover GDOT's Pavement Maintenance and Resurfacing, Restoration, or Rehabilitation Program. This program includes preventative maintenance (PM); resurfacing, restoration, or rehabilitation (3R); and reconstruction projects per the agreement between the GDOT and the Federal Highway Administration (FHWA).

PM projects are defined as the planned strategy of cost effective treatments to an existing roadway system and its appurtenances that preserves the system, retards future deterioration, and maintains or improves the functional condition of the system without increasing structural capacity.

The following are examples of PM projects:

- shoulder repair, including mitigation of edge drop offs, upgrading guardrail, and/or barrier components
- the addition of paved or stabilization of unpaved shoulders
- installation of milled rumble strips
- activities related to asphalt pavement surface preservation (e.g. crack sealing, joint sealing, slurry seal, isolated deep patching etc.)
- asphalt resurfacing that includes replacement of the surface lift of dense-grade asphalt, or an open-graded friction course (if present) not to exceed three inches.
- activities related to treatments for Portland Cement Concrete (PCC) pavements (e.g. joint sealing, grinding, dowel retrofit and partial depth repair)
- PCC slab replacement that does not exceed more than 50% of slabs.
- restoration or extension of drainage systems
- installation or replacement of signs and or pavement markings.

- removal of vegetation in clear zone
- addition and/or replacement of landscaping
- execution of encroachment permits
- activities relating to bridge preservation (e.g. crack sealing, joint repair, scour countermeasures and painting.)
- removal or shielding of roadside obstacles

Guidelines and procedures for PM projects shall be governed by the terms of GDOT's FHWA-approved preventive maintenance agreement**.**

3R projects are generally defined as any pavement treatment that is neither PM nor reconstruction. The following are examples of 3R projects:

- resurfacing, restoration or rehabilitation activities related to structural asphalt pavement , including isolated base repair
- mill and inlay deeper than the first dense course, but not including the base course
- activities related to PCC pavement treatments (e.g. continuous slab replacement project that exceed more than 50 percent of the slabs being replaced in any given lane or area)
- widening of lanes and shoulders that does not increase the number of lanes
- selected alterations to vertical and horizontal alignments
- intersection improvements
- passing lane projects
- bridge and culvert rehabilitation or widening that does not increase the number of lanes

Reconstruction projects are generally more complex in project scope and carry a higher cost than PM or 3R projects. The following are examples of reconstruction projects:

- activities related to asphalt pavement reconstruction (e.g. the removal of the entire pavement structure through the base course except for isolated base repair associated with PM or 3R projects)
- activities related to PCC pavement reconstruction (e.g. slab removal and replacement that is continuous throughout the project or when a significant amount of base is being replaced)

11.1.1. Procedures and Guidelines

Refer to **Figure 11.1.** and the following text to determine appropriate preconstruction process that should be followed for each of the different categories (PM, 3R or reconstruction projects). PM projects do not need to follow the Plan Development Process (PDP)[1]. However, PM projects on Interstate highways require both a concept meeting and a brief concept report. 3R projects shall follow a Streamlined PDP, which is summarized in **Figure 11.1.** Some exceptions are listed below.

3R projects prepared by the GDOT Office of Maintenance and/or Office of Preconstruction shall follow the PDP with the following exceptions/changes:

[1] GDOT. *Plan Development Process (PDP)*. Available on the GDOT R.O.A.D.S. website at: http://www.dot.state.ga.us/dot/preconstruction/r-o-a-d-s/Other%20Resources/index.shtml

- **Chapter 4. Project Planning and Programming**
  - Generally, most of this chapter will not apply to 3R projects that are using only lump-sum maintenance funds. However, in all cases, TPro[2] shall be updated, as prescribed by Chapter 10 of the PDP.

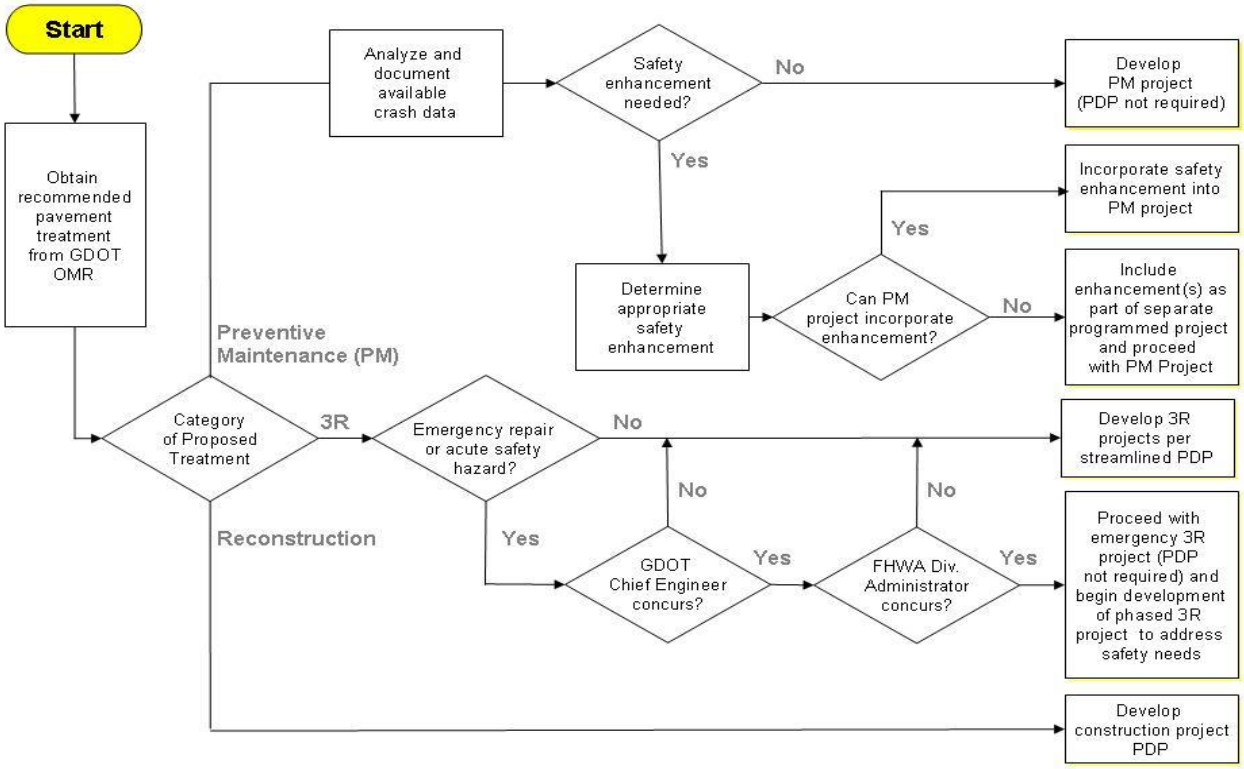

Figure 11.1. PDP Process for PM, 3R, and Reconstruction Projects

- **Chapter 5. Concept Stage**
  - 3R projects will not require an initial concept meeting
  - To ensure early coordination from other GDOT offices, a concept meeting, report, and solicitation of comments on the report is required. However, some of the PDP's specific requirements for a concept meeting and report may not apply if there are no right-of-way, utility, or environmental impacts
  - For 3R projects being developed by the GDOT Office of Maintenance, the Assistant Preconstruction Director will be responsible for distributing the concept report for comments, consolidating comments, recommending approval of the concept report, and forwarding the concept report to the Chief Engineer for approval.
- **Chapter 6. Preliminary Design (If applicable)**
  - A *Project Design Data Book* is not required

[2] Refer to the GDOT PDP for additional information about TPro, the GDOT Preconstruction Project Management System.

- The preliminary and final field plan reviews may be combined if recommended by Engineering Services

- **Chapter 7. Final Design**
  - If no right-of-way is required, neither the *Location and Design Report* nor the advertising of location approval is required.
- **Chapter 8. Design Guideline Variances**
  - As intended by the *PDP*, future projects in the Statewide Transportation Improvement Plan, (STIP) and Regional Transportation Plan (RTP) will be considered in the review and approval of design exception requests.

Reconstruction Projects shall follow the Plan Development Process

The geometric and safety guidelines for PM, 3R, and reconstruction projects are summarized in **Table 11.1.**

Table 11.1. Geometric and Safety Guidelines for 3R, PM, and Reconstruction Projects

Classification	Type of Work	Design Standards	Upgrade Guardrail if not meeting:	Update Cross Slope and SE	Design Exception Approval
National Highway System (NHS)					
Interstate	Reconstruction and 3R	AASHTO *Green Book* / Interstate Stds.	NCHRP 350	Yes	FHWA
	PM	n/a	NCHRP 350	If crash history warrants	n/a
Freeway Non-Interstate	Reconstruction and 3R	AASHTO *Green Book*	NCHRP 350	Yes	GDOT
	PM	n/a	NCHRP 350	If crash history warrants	n/a
Non-Freeway	Reconstruction	AASHTO *Green Book*	NCHRP 350	Yes	GDOT
	3R	GDOT 3R Standards (1)	NCHRP 230	Yes	GDOT
	PM	n/a	NCHRP 230 (2)	Not required	n/a
Non-NHS					
Non-NHS All Roads	Reconstruction	AASHTO *Green Book*	NCHRP 350	Yes	GDOT
	3R	GDOT 3R Standards (1)	NCHRP 230	Yes	GDOT
	PM – State Route	n/a	NCHRP 230	Not required	n/a
	PM – LARP Work	n/a	Not Required	Not required	n/a

Notes:
(1) Per AASHTO *Green Book*, as amended by this Manual, **Section 11.1.2**. and **Section 11.1.3.**
(2) Upgrade existing guardrail and end terminals, if not meeting referenced standards
Source: Transportation Research Board (TRB), National Cooperative Highway Research Program.

11.1.2. Controlling Criteria for Non-Interstate Systems (GDOT 3R Standards)

Guidelines for non-interstate 3R projects will follow the current edition of the American Association of State Highway and Transportation Officials (AASHTO) *A Policy on Geometric Design of Highways and Streets (Green Book)* for all projects except the controlling criteria listed below will apply.

Design Speed

The design speed shall be equal to or greater than the posted speed. If the existing roadway does not meet the design speed criteria and cannot be reasonably corrected, a design exception must be requested and approved.

For projects on roadways with no posted speed limit, an appropriate design speed should be selected by the designer. For information on selection of design speed, refer to **Chapter 3. Design Controls, Section 3.2. Design Speed** of this Manual.

Lane Width

Lane widths shall be 12-ft., except where it has been determined that a lesser width is appropriate for a given situation. For lane widths less than 12-ft., a design exception/variance must be requested.

Usable Shoulder Width

The usable shoulder widths for two-lane roadways is determined by classification and Average Daily Traffic (ADT). Refer to **Table 11.2.**

Table 11.2 Usable Shoulder Width for Two Lane Roadways

Roadway Classification	ADT < 400	ADT 400 - 1,500	ADT 1,500-2,000	ADT > 2,000 or DHV > 200
Local Road	2-ft.	5-ft.	6-ft.	8-ft.
Collector	2-ft.	5-ft.	6-ft.	8-ft.
Arterial	4-ft.	6-ft.	6-ft.	8-ft.

Multi-Lane Roadways

All multi-lane roadways should have at least an 8-ft. usable shoulder.

Bridge Widths

Geometric design standards shall be in accordance with the AASHTO *Green Book*. Summaries of minimum bridge widths for 2-lane and multilane bridges on non-interstate highways having state route numbers are provided in **Table 11.3.** and **Table 11.4.,** respectively.

Table 11.3 Minimum Bridge Widths for Non-interstate Highways – Rural Sections (2-Lanes)

Design Speed	Design Year ADT	Bridge Width Clear Distance	Design Live Loading
< 50 mph	0-399	30-ft.	HS-20 (MS-18)
$\geq$ 50 mph	0-399	32-ft.	HS-20 (MS-18)
All Speeds	400-1,999 (DHV < 200)	38-ft.	HS-20 (MS-18)
All Speeds	2,000 – 4,000 (DHV = 200-400)	40-ft.	HS-20 (MS-18)
All Speeds	> 4,000 (DHV > 400)	40-ft.	HS-20 (MS-18)

Table 11.4. Minimum Bridge Widths for Non-interstate Highways – Multilane Rural Sections

Divided/Undivided	Bridge Width Clear Distance	Minimum Shoulder Width
Undivided (4 or more lanes)	Pavement Width + 20-ft.	10-ft. right and left
Divided	Pavement Width + 14-ft.	4-ft. inside 10-ft. outside

Minimum bridge widths for local roads and streets not having state route numbers are described below and in **Table 11.5.:**

Table 11.5. Minimum Bridge Widths for Local Roads and Streets (Rural Sections) (1)

Design Speed	Design Year ADT	Bridge Width Clear Distance	Design Live Loading
All Speeds	0-399(2)	28-ft.	HS-20 (MS-18)
All Speeds	400 – 999	30-ft.	HS-20 (MS-18)
All Speeds	1,000 – 1,999 (DHV = 100 – 199)	32-ft.	HS-20 (MS-18)
≤ 50 mph	2,000 – 4,000 (DHV = 200 – 400)	38-ft.	HS-20 (MS-18)
> 50 mph	2,000 – 4000 (DHV = 200 – 400)	40-ft.	HS-20 (MS-18)
All Speeds	> 4,000 (DHV > 400)	40-ft.	HS-20 (MS-18)

Notes:

(1) *Two lanes without curb. For low volume roads with an approach roadway width of one lane, a minimum bridge width equal to the approach roadway width may be selected with concurrence of the Chief Engineer.*

(2) *For low volume roads with an approach pavement width of 20-ft., a bridge width of 24-ft. is permissible.*

In urban sections (with curb), the minimum clear width for all new or reconstructed bridges shall be the curb-to-curb width of the approaches, with the exception of 2-lane, 2-way bridges, where the minimum clear width shall be 28-ft.

Sidewalks shall be provided on bridges where curb and gutter is provided on the approach roadway.

The replacement of existing concrete post and open railing systems constructed prior to 1964 shall be evaluated on a case by case basis.

Table 11.6. Horizontal Clearance

Structural Capacity

The structural capacity for existing / retained bridges shall be: HS-15 (MS-13.5). The structural capacity for new bridges shall be: HS-20 (MS-18). Refer to the current GDOT *Bridge and Structures Policy Manual*[3] for further guidance related to structural capacity.

Horizontal Clearance

The minimum horizontal clearances by posted speed are listed in **Table 11.6.** Note: The clearances listed are based on 1996 AASHTO *Roadside Design Guide* using a 50% lateral to extend probability.

For curbed areas, horizontal clearance width shall be 18-inches from face of curb.

Posted Speed	Horizontal Clearance
35 mph	4-ft.
40 mph	4-ft.
45 mph	5-ft.
50 mph	6-ft.
55 mph	7-ft.
60 mph	8-ft.
65 mph	9-ft.

Source: AASHTO. Roadside Design Guide, 1996

Vertical Clearance

A minimum of 14.5-ft. shall be maintained as vertical clearance at all existing structures. Resurfacing shall be performed so as not to violate this requirement.

Horizontal Alignment

In cases where AASHTO guidelines are not met, refer to the conditions and corresponding policies listed in **Table 11.7.**

Table 11.7. Horizontal Alignment for Existing Features not meeting 3R Guidelines

Condition	Accident History	Policy
≤ 10 mph below AASHTO guidelines	Low, compared with statewide average	Retain. The designer shall address and justify existing features to be retained which do not meet 3R guidelines.
≤ 10 mph below AASHTO guidelines	Directly related accident history compared with statewide average	Correct to AASHTO guidelines or to the highest design speed practicable and request a design exception.
> 10 mph below AASHTO guidelines	Not applicable	Correct to AASHTO guidelines if practicable. If not, correct to highest design practicable and request a design exception

Vertical Alignment

The same policies described in **Table 11.7.** for horizontal alignment shall apply to vertical alignment.

Cross Slope

Pavement cross slope shall be a minimum of 1.5% and desirable 2.0%. Cross slope should be increased to 2.5% in areas where an increase is practicable and justified. For wide pavements, cross slope can be increased with each additional lane width.

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[3] GDOT. *Bridge and Structures Policy Manual.* The current manual is available online at: http://www.dot.state.ga.us/dot/preconstruction/r-o-a-d-s/DesignPolicies/

Grades

In areas where accident history indicates a grade-related problem the designer shall correct to AASHTO guidelines; otherwise a request for a design exception will be necessary. In areas with no grade-related problems, existing grades may be retained.

Superelevation

- **Rural Collectors and Arterials:** The maximum superelevation for rural collectors and arterials shall be 10%.
- **Urban Collectors and Arterials:** The maximum superelevation for urban collectors and arterials shall be 4% to 6%

11.1.3. Other Design Considerations for 3R Projects (GDOT 3R Standards)

Design Speed on Roadways with no Posted Speed Limit

If a roadway is paved and does not have a posted speed limit, the designer should select a design speed commensurate with the functional classification and existing geometric features of the roadway, provided such features are not defective. The selected design speed should be consistent with the speeds that drivers are traveling and are likely to expect on the facility. For county roads or city streets, the designer should coordinate with the local jurisdictional authority on the selection of the posted speed limit and the recommended design speed. Efforts should be made to have the local jurisdictional authority post a speed limit on the road equal to or less than the selected design speed.

The designer should select a design speed as high as practical to attain a desired degree of safety, mobility, and efficiency within the constraints of environmental quality, economics, aesthetics, and other social or political effects.

On unpaved country roads or city streets, the selected design speed shall be 35 mph or greater. A design exception will be required where this is not practical or appropriate.

Shoulder Treatment and Procedures for Passing Lane, Turning Lane, or Lane Addition Projects

GDOT's policies on the required widths of existing shoulders are as follows:

On the widened side:

- Existing shoulders shall be widened to meet AASHTO Guidelines.
- Clear zone requirement for the specific design situation should be followed. Refer to **Chapter 5, Roadside Safety and Horizontal Clearance** and the AASHTO *Roadside Design Guide* for further guidance on clear zone requirements.

On the non-widened side:

- Where sufficient right of way exists, shoulder widths should meet AASHTO guidelines.
- Where sufficient right of way does not exist and the accident data does not indicate that the existing shoulder contributes directly to the accident history, the existing shoulder may be retained.
- Where sufficient right of way does not exist and the accident data indicates that the existing shoulder contributes directly to the accident history, AASHTO width shoulders shall be provided unless a design exception is requested and approved.

Guardrail and/or Barrier

Guardrail and/or barrier at bridge ends within the project limits shall be upgraded to current AASHTO guidelines. The designer shall evaluate the need for guardrail and/or barrier at other locations with existing warrants and consideration should be given for correction consistent with existing warrants. The designer should also take into account accident history when considering the need for additional guardrail and/or barrier.

Existing guardrail and/or barrier shall be evaluated under current warrants and if warranted, upgraded to current AASHTO guidelines. If an existing guardrail and/or barrier is not warranted, it shall be removed.

Where it is determined that a guardrail and/or barrier is to be replaced or installed, the additional shoulder width defined as T in GDOT *Construction Standards*[4] shall be obtained. In some cases, obtaining the T distance may require placing guardrail and/or barrier over a portion of the existing shoulder, which would thus reduce the usable shoulder width. If this occurs, the controlling criteria described in **Section 11.1.2.** of this Manual shall apply, and a design exception will be required if the minimum usable shoulder width cannot be maintained.

Drainage Structures

All minor drainage structures shall be extended to avoid encroachment on the minimum shoulder widths as described in **Section 11.1.2.** of this Manual or the prevailing existing shoulder width, if it is greater.

Major drainage structures shall be evaluated on a case by case basis. Major drainage structures must be extended, where necessary, to achieve the minimum (3R) shoulder widths. Where such structures encroach on existing shoulders, but are beyond the minimum widths, the designer should consider extensions or the installation of guardrail and/or barrier.

Delineation (Advance Warning Signs)

Delineation can be especially effective where minimum or less than desirable geometric features are involved. Since 3R projects often involve such features, GDOT allows liberal application of delineation techniques. Bridges narrower than the approach roadway and sharp curves should be delineated using reflective delineators, chevron alignment signs, or other appropriate devices.

Signs and Pavement Markings

The designer shall include standard signing and pavement markings in accordance with the current *Manual of Uniform Traffic Control Devices (MUTCD)*[5].

Railroad grade crossings shall be treated in accordance with current criteria. Where active protective devices are needed, they may be installed as a separate project under the Rail-Highway Crossing Improvement Program.

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[4] GDOT Construction Standards are available online in English and Metric units at: http://tomcat2.dot.state.ga.us/stds_dtls/index.jsp

[5] FHWA. *Manual on Uniform Traffic Control Devices (MUTCD).* The 2003 version of this publication is available online at: http://mutcd.fhwa.dot.gov/kno-2003r1.htm

Design Exceptions

Where existing features that do not meet these guidelines are proposed to be retained or constructed, the designer shall submit requests for design exceptions to Engineering Services for approval. The request for design exceptions must identify the sub-standard features, give the justification for retention, and describe any proposed mitigation.

The designer shall examine accident data with the objective of identifying causative factors that could be corrected as a part of the project. If physical correction is not feasible or cost effective, mitigation measures must be considered and resolution documented in the request for design exception. The process for submitting design exception requests is outlined in the GDOT *PDP*.

Americans with Disabilities Act (ADA)

All areas shall be in compliance with Americans with Disabilities Act (ADA) requirements[6] on all projects within the project limits. There are no exceptions to ADA requirements.

11.2. Special Design Considerations for Other Project Types

GDOT determines the need for projects other than the traditional roadway project. The following section discusses design guidelines that are intended to provide for a uniform design approach for these types of stand alone projects. These guidelines are not intended to replace the Plan Development Process or to be a comprehensive or detailed manual for the design of these facilities, but guidelines for designers in preparing plans for these other project types. In many cases the intent of the project is clear and the designer should strive to achieve the purpose and design intent of the project within the context of earlier chapters of this Manual. Each topic contains the GDOT resource office with the most experience with a type of non-traditional, stand alone project to contact for additional information.

Guidelines for the following types of projects are included in this section:

- bridge fencing projects
- bridge jacking projects
- ITS projects
- signing and marking projects
- noise barrier projects

11.2.1. Bridge Fencing Projects

The resource office for bridge fencing projects is the GDOT Office of Bridge Design.

The primary purpose of a bridge fencing project is to create a raised barrier that will deter persons from dropping or throwing objects from the bridge onto vehicles or pedestrians below the bridge. The raised barrier on bridge fencing projects is typically a fence that is added to an existing bridge. The project limits should be defined as the extent required to accommodate the bridge fencing. Standard fence details should be utilized whenever possible.

[6] Visit the following FHWA web page for additional information relating to Americans with Disabilities Act (ADA) requirements http://www.fhwa.dot.gov/environment/te/te_ada.htm

11.2.2. Bridge Jacking Projects

The resource office for bridge jacking projects is the GDOT Office of Bridge Design.

The primary purpose of a bridge jacking project is to raise an existing bridge to correct a deficient vertical clearance or in anticipation of a change in the existing feature underneath the bridge that would cause a deficient vertical clearance.

Roadway approaches to the existing bridge should be designed to account for the elevation difference from raising the bridge. The project limits should be defined as the extent required to accommodate the bridge jacking.

Upgrading major roadway items within the project limits to current standards is not required. In addition, bridge widths and shoulders that do not meet current standards are not required to be upgraded with the bridge jacking project.

Minor design elements within the project limits of the bridge jacking project should be upgraded to current standards. Minor roadway elements include such items as: guardrail, signing and marking, etc.

Major design deficiencies within the project limits and minor design deficiencies outside the project limits should be noted and reported to the GDOT Office of Planning, which may then consider adding a future project to the current GDOT construction work plan. Bridge deficiencies noted in the field should be reported to the GDOT Office of Maintenance immediately.

11.2.3. Intelligent Transportation System (ITS) Projects

The resource offices for ITS Projects are the GDOT Office of Traffic Operations (concept) and the GDOT Office of Traffic Safety and Design (design).

The primary purpose of an ITS project is for congestion mitigation or traffic management. ITS projects include the design of systems of real-time traffic conditions sensors, surveillance devices, traffic control devices, and motorist information devices. These systems may be designed for installation along an existing roadway corridor as a stand alone project, or for inclusion into a project for other improvements to a roadway corridor.

The installation of ITS devices shall not interfere with or affect the visibility of the existing signing or sight distance. Where conflicts are unavoidable, the ITS plans will include replacement signing meeting the standards and guidelines in the *MUTCD* and meeting GDOT standard installation details.

11.2.4. Signing & Marking Projects

The resource office for signing and marking projects is the GDOT Office of Traffic Safety and Design.

The primary purpose of a signing and marking project is to provide stand alone signing and marking improvements. For interstate facilities, FHWA requires all interstate safety features be upgraded to current standards within the project limits. For non-interstate projects, generally other items that do not meet current standards will not be addressed on these projects.

11.2.5. Traffic Signal Projects

The resource office for Traffic Signal Projects is the GDOT Office of Traffic Safety and Design.

The primary purpose of a Traffic Signal Project is to provide a traffic signal design for at-grade intersections. The majority of projects will be for the replacement and upgrade of obsolete equipment at intersections with existing signals, but this type of project may also be for the design of a new traffic signal.

Geometric improvements such as turn lanes are often included in traffic signal projects, but only to the extent to provide the efficient operation of the signal.

Substandard radius returns on the side streets and storage/taper lengths shall be improved wherever feasible.

Raised concrete islands should be considered during design to facilitate pedestrian movements as necessary.

For skewed angle intersections, turning-radius templates for an appropriate design vehicle shall be used to determine the appropriate opening. The width of the side street shall also be considered in determining the length of the median opening.

11.2.6. Noise Barrier Projects

The resource office for Noise Barrier Projects is the GDOT Office of Environment and Location (OEL). Existing and predicted traffic generated noise impacts are analyzed during environmental studies. Noise barrier projects can only be constructed where reasonable and feasible. Therefore, a procedure is necessary to determine when and where additional expenditure of public funds for noise barriers is considered reasonable and feasible.

Nationally, noise level prediction is based upon the FHWA Highway Traffic Noise Prediction Model (STAMINA) or the Traffic Noise Model (TNM). However, the national vehicle emission levels contained in the STAMINA model have been replaced by emission levels measured in Georgia. In assessing traffic noise levels from a proposed project or determining the dimensions of a noise barrier, the national average source heights will be used.

Identifying Noise Impact

Two methods are used for identifying a noise impact. First, there is a comparison of predicted noise levels with FHWA's noise abatement criteria (NAC)[7]. Any predicted noise level that approaches or exceeds the applicable noise abatement criterion is considered an impact. For the purpose of this policy, GDOT has defined noise levels within 1dB of the NAC as approaching criteria.

The second method is a comparison of predicted traffic noise levels with existing noise levels. A site is considered to be impacted if there is a substantial increase from existing noise levels. A substantial increase occurs when the future predicted noise levels exceed 60 dBA L10 or 57 dBA Leq and there is an increase of at least 10 dBA or more over existing levels. Only exterior areas of

[7] Additional information relating to FHWA noise abatement criteria is available in an online Manual, *Highway Traffic Noise in the United States - Problem and Response,* at: http://www.fhwa.dot.gov/environment/probresp.htm

frequent human use would be considered for abatement measures unless there are no exterior activities likely. Frequent human exterior use areas are defined as exterior areas with a permanent fixture for the purpose of outdoor recreation (e.g., patios, decks, porches, permanently affixed picnic tables, or grills). Any interior predictions should be coordinated with the State Environmental/Location Engineer on an individual case basis.

Planning and Design Considerations

In order for a residential area to be considered for noise barriers, it must be "planned, designed, and programmed" before the date of "public knowledge" of the highway project. In determining the time relationship between residential development and public knowledge, the date a residential area is "planned, designed, and programmed" means the date foundation construction begins and the date of "public knowledge" of the highway project means the date of approval of the Categorical Exclusion (CE), Finding of No Significant Impact (FONSI) or Record of Decision (ROD) document.

Georgia does not consider it reasonable to construct barriers for sites with predicted noise levels below 60 dBA. GDOT does not consider barrier construction reasonable at locations where site characteristics would require a wall height of greater than 30-ft. or where breaks in the barrier for points of access (e.g. driveways and cross streets) would cause the barrier to be ineffective. GDOT also does not consider a barrier reasonable at locations where site characteristics prohibit a wall from obtaining a 5 dBA or greater reduction in noise levels or where the barrier would pose overriding safety and maintenance problems (i.e., across existing bridges, large drainage or culverts). Each potential noise barrier will be evaluated on a case by case basis.

FHWA noise abatement policy identifies a 5 dBA decrease in noise as a readily noticeable decrease. Therefore, whenever a noise barrier is proposed, it will be designed to achieve a minimum noise reduction of 5 dBA at all impacted sites. An impacted site is described as a single family home, apartment, individual townhouse/condominium unit, mobile home, school, church, or any other noise sensitive location. A barrier must be at least 6-ft. in height when replacing a right-of-way fence. Although noise barriers can be up to 30-ft. in height they are designed to shield only the first story of multi-story structures. A benefited site is described as any dwelling that receives a 5 dBA or greater reduction as the result of the construction of noise abatement.

The location of noise barriers should be as far from the edge of pavement as practical. Safety, maintenance, aesthetics, cost, and noise attenuation should also be considered when determining barrier locations. Where construction does not significantly increase cost, noise barriers should also serve as limited access barriers in lieu of a ROW fence. In fill sections, it will be necessary to increase the width of the fill sufficiently to have a desirable clear zone between the noise barrier and the edge of the pavement or a sufficient distance from the back of the guardrail to the barrier facing, whichever is applicable.

Cost Considerations

The cost per benefited dwelling to construct the noise barrier must be considered in determining if a noise barrier is cost effective for a given site. To aid in the determination of reasonable cost, GDOT uses the following formula:

$$\textbf{Reasonable Cost} = \text{Number of Impacted Dwellings receiving a minimum 5 dBA reduction} \times \$50{,}000 + \text{Number of additional dwellings not impacted which receive a minimum 5 dBA reduction from the construction of the abatement} \times \$25{,}000 \geq \text{Estimated Cost of Barrier}$$

In determining cost effectiveness of noise barriers, GDOT will consider cemeteries and other similar land uses associated with scattered, infrequent events not usually associated with peak traffic periods to fall into FHWA Activity Category B (see **Table 11.8**). For cost estimation such land uses will be considered as one impacted site.

Table 11.8. FHWA Noise Abatement Criteria (NAC)
Hourly A-Weighted Sound Level - decibels (dBA)*

Activity Category	Leq(h)	L10(h)	Description of Activity Category
A	57 (Exterior)	60 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 (Exterior)	70 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries and hospitals.
C	72 (exterior)	75 (Exterior)	Developed lands, properties or activities not included in categories A or B above.
D	XX	XX	Undeveloped lands.
E	52 (Interior)	55 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals and auditoriums.

**Either L10(h) or Leq(h) (but not both) may be used on a project.*

For parks and other open lands used for the purpose of outdoor recreation, the number of impacts will be derived from using one impact per 100 linear feet of impacted road frontage.

Noise abatement for schools, hospitals, hotels and motels, public meeting rooms, churches, libraries and auditoriums will be considered under Activity Category B or E, depending on the characteristics of the facility, and will be considered on a case by case basis (see **Table 11.8**). Cost effectiveness will be calculated using one impact per impacted room consisting of an exterior wall with opening windows exposed to the roadway or each room impacted under the interior noise level criteria outlined in Activity Category E. GDOT considers a room to be any area separated by permanent walls, (e.g., a classroom, cafeteria, library, gymnasium, patient room, waiting room, hotel/motel room).

A noise barrier is not considered cost effective if the barrier cost is more than the reasonable cost calculated above. The estimated cost of the barrier in the formula shown above should be calculated by multiplying the cost per square foot by the total square footage of noise barrier needed.

Additional Considerations

The concerns of impacted residents will be included in determining the reasonableness of a noise barrier. These concerns will be requested at the location and design public hearing. After a barrier has been determined to be reasonable and feasible GDOT will meet again with the benefited residents to present final noise abatement details and to solicit residents' final concerns and opinions on the reasonableness of abatement. A barrier will not be built if it is not wanted by a majority of the benefited residents.

In some cases, short gaps may exist between areas of impacts. The closure of these gaps should be considered on a project by project basis and must be approved by the Chief Engineer.

11.3. Design Elements for Other Project Types

11.3.1. Design Database

Typically field surveys shall be considerably more limited with these other projects. Prior to commencing field surveys, the design team shall hold a pre-survey meeting and/or an onsite inspection to determine surveying requirements. Maximum use shall be made of "as-built" construction plans in order to minimize the requirements for collection of field data. As-built drawings, however, shall be verified before relying on them for accurate representation of existing conditions.

Limits of surveys should be determined on a case by case basis prior to the start of surveys. The limits of surveys will depend upon the type of project.

Bridge Fencing Projects

For bridge fencing projects, survey sketches of each site are typically adequate as a database. The designer or design team member can perform the bridge sketches, noting the number of lanes, width of sidewalk, length and type of guardrail, etc.

Each bridge should be treated as a stand-alone location, with no relationship to other bridges in the project corridor, except where bridges are close enough together to affect the design. Project-length horizontal or vertical survey controls are not necessary.

Bridge Jacking Projects

Designers should communicate with the District office and verify there is not another project planned for each bridge jacking location to determine if the bridge jacking should be included in that project and not as a separate project.

Bridge Jacking Project limits will depend upon the amount of bridge raising and the impact to each roadway approach anticipated and the topography of the side slopes. Field surveys should generally include, but not be limited to:

- existing bridge features
- geometry
- digital terrain model (DTM)
- existing right-of-way (in the absence of right of way plans or visible markers, the designer may assume that the fence is the right-of-way line.)
- drainage structures within the project limits (curb & gutter, catch basins, manholes, median drop inlets, cross culverts, side drain pipes etc.)
- existing guardrail
- driveway locations
- utility poles and strain poles
- signage
- other significant topographic features

ITS Projects

When an ITS project is included in other roadway improvement activities, the field survey detail will be determined by the requirements of the roadway work. However, it will be necessary for the designer to obtain detailed field information at the location of the support structures required for

dynamic message signs (DMS), camera support poles and other field devices such as junction boxes. Detailed topographic diagram information that includes the location of existing signs, guardrail and drainage structures is essential. Project-length horizontal or vertical survey controls are generally not necessary. Limits of surveys will be determined by the scope of the project or by the project design where the ITS devices are a supplement to other work proposed.

Signing and Pavement Marking projects and Traffic Signal projects

Project-length horizontal or vertical survey controls are not necessary, except in areas where sign/signal sight distance is an issue.

Necessary control should be determined at a pre-survey site visit. The limits of surveys will depend upon the length of project and the topography of the roadway. Field surveys should generally include but not be limited to:

- existing geometry of the roadway
- existing right-of-way (in the absence of right of way plans or visible markers, the designer may assume that the fence is the right-of-way line.)
- drainage structures within the project limits (curb & gutter, catch basins, manholes, median drop inlets, cross culverts, side drain pipes etc.)
- existing guardrail
- driveway locations
- utility poles and strain poles
- signage
- bridges
- other significant topographic features

The design database shall include a schematic diagram of each roadway's geometry and significant features instead of the highly detailed mapping normally required for roadway project design. Cross sections are not required for either signing and marking projects or traffic signal projects. However, if additional safety features are to be upgraded with the project, the project manager and designer should determine whether cross sections are warranted to accomplish the design. If required, ground slopes outside existing roadways shall be provided at 50-ft. to 100-ft. intervals, as deemed appropriate by terrain conditions. Cross sections shall only be provided at areas requiring significant excavation or embankment, and may be substituted with "original plan" or "as-built" templates as long as accurate earthwork estimates can be determined.

The designer shall use the ground survey data or template information to estimate earthwork quantities and to determine construction limits. In most cases, cross sections will not be required for medians, unless conditions warrant (e.g., split profile, drainage structures that may require adjustment or unusual circumstances).

Noise Barrier Projects

For Noise Barrier Projects, necessary control should be determined at a pre-survey site visit. The limits of surveys and cross sections will depend upon the length of project, the topography of the roadway and ground slopes between the right of way and limits of roadway.

11.3.2. Construction Plans

Unless noted otherwise, all of these other projects will be developed through the streamlined *PDP* or similar process. The respective resource office, in consultation with Engineering Services and the project manager, will determine the appropriate process.

11.3.3. Pavement Design

Where required, it is anticipated that most pavement designs will consist of milling, overlay and leveling. Pavement designs will be provided and/or approved by the GDOT Office of Materials and Research upon completion of the existing pavement analysis and soil survey.

11.3.4. Environmental

It is expected that most sites will involve a NEPA Categorical Exclusion (CE). The GDOT Office of Environment and Location shall be notified as soon as possible of any anticipated impacts to existing waterways, including streams and wetlands.

11.3.5. Earthwork

If earthwork is required, normal standards shall apply; however, because earthwork is generally minimal, the earthwork shall be let as "Grading Complete - Lump Sum." The designer should calculate earthwork volumes, but no quantities shall be shown in the plans. Removal of vegetation within the clear zone shall be included within the project limits.

11.3.6. Drainage

If drainage is required, normal standards shall apply. Existing drainage structures in conflict with the proposed improvements should be extended or relocated in order to maintain adequate drainage. Existing drainage patterns shall not be altered significantly without justification.

11.3.7. Guardrail and/or Barrier

At locations with existing guardrail to be retained, the designer shall determine if the guardrail meets current GDOT standards discussed in earlier chapters of this Manual. All guardrail and/or guardrail anchorages within the project limits that do not meet current GDOT standards will be replaced.

In locations where the guardrail extends outside the project limits, the designer shall determine if the new guardrail should tie into the existing guardrail or whether the entire run of existing guardrail should be replaced and the project limits extended.

11.3.8. Erosion Control Plans

Where required, erosion control items shall be shown clearly on the construction plan sheets. Typically these other projects do not require separate Comprehensive Monitoring and Erosion Control Plans unless any one site within the project involves land disturbance of more than one acre.

11.3.9. Traffic Signal Plans

The designer shall notify the GDOT Office of Traffic Operations of any anticipated impacts to existing traffic signals.

11.3.10. Signing & Markings

All signs located within the project limits shall be removed and replaced unless otherwise directed. The plans should note that all signs and pavement markings shall be in accordance with *MUTCD* and GDOT standards. In event that *MUTCD* requirements or guidelines conflict with GDOT policy, GDOT policy shall take precedence.

For bicycle lanes and bicycle shoulders, signs and pavement marking shall be replaced in kind.

11.3.11. Utilities

The designer shall coordinate with the GDOT Office of Utilities and the District Office Utilities Engineer regarding the location of utilities. Base plan sheets shall be submitted at the earliest possible time in order to facilitate obtaining existing utilities information from utilities owners. It is anticipated that no significant public utilities relocations or adjustments will be required.

11.3.12. Traffic Control Plans

In most cases, traffic control plans are not required. Standard details for traffic control should be utilized.

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